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REMARKS

The above amendment to Claim 4 serves only to place this claim in independent form. This amendment is presented in response to the Examiner's statement that Claim 4 is objected to. Applicants have therefore assumed that Claim 4 is allowable if rewritten in independent form.

The withdrawal of the rejection of Claims 1-5 as being unpatentable under 35 U.S.C. § 103(a) in view of the JP 62256893 reference is gratefully acknowledged by the Applicants.

In addition, Applicants gratefully acknowledge the allowance of Claims 11-15.

Claims 1-3 and 5 were again rejected under 35 U.S.C. § 103(a) as being unpatentable over the Woerner et al reference (U.S. Patent 3,903,126).

The Woerner et al reference (U.S. Patent 3,903,126) discloses biuret group containing polyisocyanates. The biuret group containing polyisocyanates in the Woerner et al reference comprise the reaction product of aliphatic and/or cycloaliphatic diamines with polyisocyanates. These components are reacted in proportions to give an NH_2 to NCO ratio of from 1:3 to 1:100.

Applicants respectfully submit that the presently claimed invention is not properly rejected as being obvious in view of the Woerner et al reference.

The Woerner et al reference describes biuret group containing polyisocyanates. In particular, these may be prepared from various polyisocyanates including toluene diisocyanate, and aliphatic and/or cycloaliphatic diamines. See column 1, lines 3-5; column 1, line 65 through column 2, line 3. Applicants respectfully submit that it is readily apparent that the invention of the Woerner et al reference does not properly suggest the presently claimed invention to one of ordinary skill in the art.

The amine group containing compounds contemplated for preparing the biuret group containing polyisocyanates of the Woerner et al reference are diamines, and

PO-7865

- 10 -

specifically aliphatic and/or cycloaliphatic diamines. By comparison, the present invention clearly requires a secondary monoamine to be reacted with the toluene diisocyanate. Such amine compounds are not disclosed or suggested as being suitable by the Woerner et al reference. Accordingly, this reference does not render the presently claimed invention obvious to one of ordinary skill in the art.

The Examiner's position as stated in the Final Office Action is that:

"[W]oerner teaches the preparation of biuret-containing polyisocyanates from biuret, and specifically, isomer mixtures of toluene-2,4-diisocyanate and toluene-2,6-diisocyanate. See column 3, lines 30-34. The examiner notes that the use of monoamines is contemplated by the reference, see column 1, line 24, and is therefore within the motivation of those of ordinary skill." (See page 3, 2nd full paragraph of the final Office Action dated November 3, 2006.)

Applicants respectfully submit that the Woerner et al reference does not contemplate "the use of monoamines" as stated by the Examiner. The portion of the disclosure of this reference which is being relied on summarizes "proposals" for biuretizing isocyanates. See column 1, lines 18-32 of the Woerner et al reference. This portion of the disclosure specifically states that:

"...has also been proposed to biuretize isocyanates by using amines and thus to introduce elements other than diisocyanate elements into the biuret group-containing polyisocyanate. The relevant literature, however, always stresses that only very specific amines, for example, W,W'-diamino polyethers having molecular weights of from 200 to 6000, secondary monoamines, secondary diamines, dilute aromatic diamine solutions or aromatic diamines whose reactivity to isocyanates is reduced by steric or electronic influences, can be reacted with diisocyanates in a controllable reaction.

As Applicants previously pointed out, this portion of the reference (i.e. the background of the invention of Woerner et al) is summarizing various proposals for biuretizing isocyanates, and at best, broadly discloses secondary monoamines as possible reactants. This disclosure only provides a very broad reference to the "relevant literature", but in actuality, provides no specific literature references or any

PO-7865

- 11 -

details of these "literature references". Thus, it is unclear whether such literature references actually exist, and what information, if any, is disclosed by such references which would render the presently claimed invention obvious to one of ordinary skill in the art.

Only one reference, i.e. German Published Application 1,568,017, is disclosed in the background of the Woerner et al reference. This reference is described therein as disclosing biuret group-containing polyisocyanates obtained directly from aromatic diamines and diisocyanates, with the reaction being carried out in solvents boiling at a temperature below the boiling point of the isocyanate. This is obviously not pertinent to the patentability of the claimed invention.

The two references cited by the Woerner et al reference, i.e. U.S. Patents 3,441,588 and 3,462,470, have been reviewed by Applicants for potential relevance to the presently claimed invention. It is respectfully submitted that neither of these references fairly suggest the presently claimed invention to one of ordinary skill in the art.

U.S. Patent 3,441,588 discloses polyether polyisocyanato biurets, and U.S. Patent 3,462,470 discloses liquid polyisocyanate compositions and a process for the manufacture of these liquid compositions. U.S. Patent 3,441,588 discloses polyether polyisocyanates which have biuret groups and are produced from ω,ω' -diamino polyethers and diisocyanates. Liquid polyisocyanate compositions are described in U.S. Patent 3,462,470 which do not undergo a rapid increase in viscosity and do not deposit solids masses upon storage (see column 1, line 71 through column 2, line 2). These liquid polyisocyanates are prepared by treating toluene diisocyanate mixtures with small amounts, e.g. from 0.5 to 8.5% by weight, of an aromatic diamine, at a temperature of 150 to 200°C for 1 to 5 hours. Accordingly, Applicants respectfully submit that neither of these references are of no more relevance to the patentability of the presently claimed invention than the Woerner et al reference.

It is readily apparent that the presently claimed invention requires a secondary monoamine group containing compound. Secondary monoamine group containing compounds are not disclosed by either U.S. Patent 3,441,588 or U.S. Patent 3,462,470.

Applicants respectfully submit that the broad statement in the background section of the Woerner et al reference concerning secondary monoamines is inconclusive at best, and does not fairly suggest the presently claimed invention to one of ordinary skill in the art. The only remaining information provided in the background section of Woerner et al reference relative to biurets prepared from monoamines is at column 1, lines 29-43 which discloses the reaction occurs between monoamines and diisocyanates (specifically hexamethylene diisocyanate) with the elimination of the monoisocyanate corresponding to the monoamine. It then states that this process suffers from a relatively slow reaction rate (and specifically mentions hexamethylene diisocyanate and water) and the formation of by-products (i.e. insoluble polyureas) which are complicated and expensive to remove. Applicants respectfully submit that this disclosure by the Woerner et al reference would lead the one of ordinary skill in the art to conclude that it is difficult and complicated to form biurets from diisocyanates and monoamines. Thus, contrary to demonstrating that the use of secondary monoamines was routine in the art, the Woerner et al reference teaches that problems plague the reaction between monoamines and diisocyanates. Accordingly, this reference does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

In light of the problems described using hexamethylene diisocyanate in preparing biurets, why would one of ordinary skill in the art substitute toluene diisocyanate in this process? Furthermore, assuming motivation exists to make the substitution, why would one skilled in the art not expect to encounter the same difficulties and problems as noted in the background of the Woerner et al reference?

PO-7865

- 13 -

Contrary to this disclosure, Applicants have found that it is possible to prepare stable, liquid, biuret-modified isocyanates which comprise (a) a secondary monoamine which is selected from the group consisting of aliphatic monoamine compounds, aromatic monoamine compounds and araliphatic monoamine compounds, and (b) toluene diisocyanate having an NCO group content of about 48.3% and comprising from 0 to 40% by weight of the 2,6'-isomer and from 60 to 100% by weight of the 2,4'-isomer, with the %'s by weight totaling 100% by weight of (b). Furthermore, a slow reaction rate was not encountered. Applicants direct the Examiner's attention to Example 1 and Example 2 on page 13, lines 14-25. The reaction time of Example 1 was only 2 hours.

Two hours as required by Example 1 of the present invention is substantially less time than the seven (7) hours required in Example 1 of the Woerner et al reference (see column 4, lines 64-66), the four (4) hours required in Example 12 (see column 6, lines 64-65), the eight and one-half hours (8.5) required in Example 15 (column 7, lines 32-34), the twelve (12) hours required in Example 16 (column 7, lines 43-44), the five and one-half hours (5.5) required in Example 17 (column 7, lines 53-54), the five and one-half (5.5) hours required in Example 20 (column 8, lines 31-33) or the six (6) hours required in Example 21 (column 8, lines 43-46). It would appear from the above mentioned times which are disclosed in the Examples of the Woerner, that a "slow reaction rate" as described with regard to the monoamine and hexamethylene diisocyanate reaction is longer than twelve (12) hours. Obviously, the presently claimed invention does not suffer from this problem. However, one of ordinary skill in the art has no insight into this upon reading the Woerner et al reference.

In addition, Applicants direct the Examiner's attention to the fact that the presently claimed stable, liquid biuret modified toluene diisocyanates have very low viscosities at 25°C. The viscosity of Example 1 is 19 mPa·s at 25°C, and of Example 2 is 9 mPa·s at 25°C. See page 13, lines 14-25 of the present application.

Although no specific viscosities are disclosed in the examples of the Woerner et al reference, one of ordinary skill in the art could not possibly expect to produce stable, liquid biuret-modified toluene diisocyanates of such low viscosities upon reading this reference. Of the twenty-one (21) examples in Woerner et al, eight (8) of these were described as viscous, highly viscous, sirupy (sic) and/or partially crystalline. See Examples 3, 7, 8, 11, 12, 16, 20 and 21. Of these, Examples 3, 7 and 16 used hexamethylene diisocyanate, Example 11 used isophorone diisocyanate, Example 12 used toluene diisocyanate and Examples 20 and 21 used diphenylmethane diisocyanate.

Only Examples 12, 20 and 21 of the Woerner et al reference used an aromatic diisocyanate, and only Example 12 used toluene diisocyanate. Since all of these were described as viscous, highly viscous, sirupy (sic) and/or partially crystalline, one of ordinary skill in the art could not possibly expect that biuret-modified toluene diisocyanates comprising a secondary monoamine and toluene diisocyanate as required by the presently claimed invention would exhibit low viscosities. This is simply not suggested.

Applicants respectfully submit that one of ordinary skill in the art has no insight into the presently claimed invention upon reading the Woerner et al reference. The Examiner is not relying on a specific reference which discloses secondary monoamines for forming biurettized isocyanate. Rather, a single broad statement made in the background of the cited reference is the sole support for the Examiner's position that Applicants' invention is obvious. However, the Examiner conveniently ignores the disadvantages and problems associated with monoamines and hexamethylene diisocyanate described in the background in making the rejection. Applicants respectfully submit that the skilled artisan would not be motivated to proceed in the necessary manner to arrive at the presently claimed invention after reading the Woerner et al reference completely. Accordingly, this reference does not properly suggest the presently claimed invention to one skilled in the art.

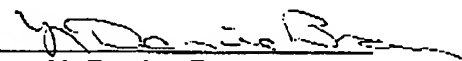
PO-7865

- 15 -

In view of the preceding amendments and remarks, it is evident that these rejections are in error and should be withdrawn. Applicants note that Claims 4 and 11-15 are allowable as written. In addition, the allowance of Claims 1-3 and 5 is respectfully requested.

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By



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PO-7865

- 16 -